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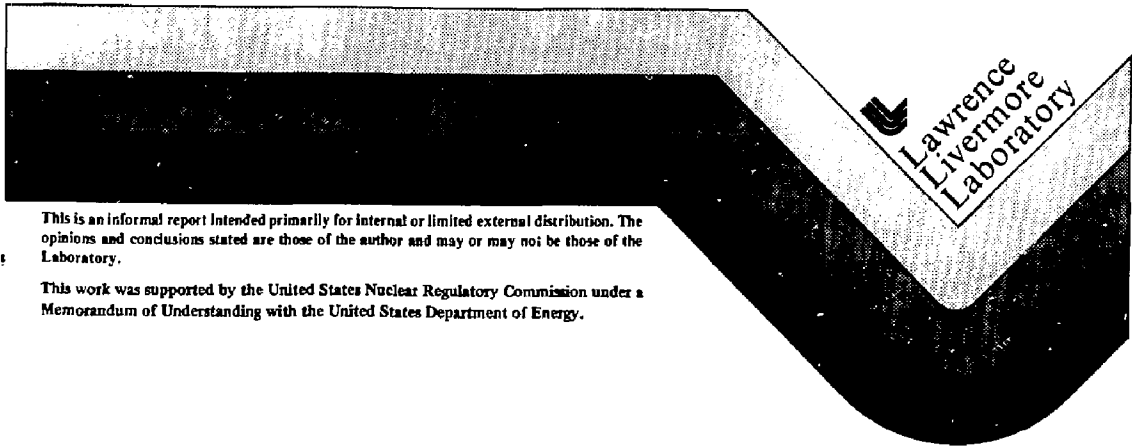
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TECHNICAL EVALUATION OF THE PROPOSED CHANGES IN THE
TECHNICAL SPECIFICATIONS FOR EMERGENCY POWER SOURCES
FOR THE BIG ROCK POINT NUCLEAR POWER PLANT

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ABSTRACT

This report documents the technical evaluation of the proposed changes to the Technical Specifications for emergency power sources for the Big Rock Point nuclear power plant. The criteria used to evaluate the acceptability of the changes include those delineated in IEEE Std-308-1974, and IEEE Std-450-1975 as endorsed by U. S. NRC Regulatory Guide 1.129. This report is supplied as part of the Selected Electrical, Instrumentation, and Control Systems Issues Technical Assistance Program being conducted for the U. S. Nuclear Regulatory Commission by the Lawrence Livermore Laboratory.

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FORWORD

This report is supplied as part of the Selected Electrical, Instrumentation, and Control Systems Issues (SEICI) Program being conducted for the U. S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Division of Operating Reactors, by Lawrence Livermore Laboratory, Engineering Research Division of the Electronics Engineering Department.

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(Docket No. 50-155)

1. INTRODUCTION

By letter to the Consumers Power Company (CPC) [Ref. 1] dated December 7, 1977, the U. S. Nuclear Regulatory Commission (NRC) requested that CPC submit Technical Specification changes for the Big Rock Point nuclear power plant that incorporated additional d-c power sources used for plant safety systems. These changes were to be consistent with the existing Big Rock Point specifications pertaining to emergency power sources. CPC responded to this request by letter dated May 11, 1978 [Ref. 2], in which they described the necessary changes, as well as other changes, which they proposed to enhance the overall clarity of the Technical Specifications.

The purpose of this report is to review these Technical Specification changes in light of the criteria and procedures set forth in IEEE Std-308-1974 [Ref. 3] and IEEE Std-450-1975 [Ref. 4] endorsed by U. S. NRC Regulatory Guide 1.129, and the NRC Standard Technical Specifications.

2. EVALUATION OF BIG ROCK POINT

2.1 INTRODUCTION

In this section, the changes in the Technical Specifications contained in Facility Operating License DPR-6, Docket 50-155, issued to Consumers Power Company on May 1, 1964 for the Big Rock Point Plant are described and then evaluated on technical bases. The guidelines for this evaluation are the criteria and procedures enumerated in IEEE Std-308-1974, "IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations," IEEE Std-450-1975, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations," and NRC Standard Technical Specifications.

2.2 DESCRIPTION OF PROPOSED CHANGES

The changes proposed for the Big Rock Point Plant [Ref. 2] are presented below. It should be noted that they include both revisions and additions to the original Technical Specifications. They are:

- A. Revise Section 11.4.5.3.A.1.(e) to read (during each operating cycle):
 - (e) Verify that the cells, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration for the station battery and the RDS batteries.
- B. Revise Section 11.4.5.3.A.1.(f) to read:
 - (f) Verify that the cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anti-corrosion material for the station battery and the RDS batteries.

- C. Revise Section 11.4.5.3.A.1.(g) to read:
- (g) Verify that the battery chargers for the station battery and the RDS batteries will supply at least 30 amperes at a minimum of 135 volts for at least 4 hours.
- D. Revise Section 11.4.5.3.A.1.(h) to read:
- (h) Verify that the capacity of the station battery and the RDS batteries is adequate to supply and maintain in OPERABLE status all of the actual emergency loads for the design time interval when the battery is subjected to a battery service test. The design time interval for the RDS batteries is one hour and for the station battery is eight hours.
- E. Revise Section 11.4.5.3.A.2.(b) to read:
- (b) Verify that the cell voltage is ≥ 2.0 volts and specific gravity is ≥ 1.2 of each cell of the station battery; and, verify the cell voltage is ≥ 6.0 volts and specific gravity is ≥ 1.2 on each cell of the RDS batteries.
- F. Revise Section 11.4.5.3.A.3 to read:
3. Weekly:
- (a) The electrolyte level of each RDS battery pilot cell and the station battery pilot cell is between the minimum and maximum level indication marks.
- (b) The pilot cell specific gravity for RDS and station batteries corrected to $(77)^{\circ}\text{F}$ is ≥ 1.2 .
- (c) The station battery pilot cell voltage is ≥ 2.0 volts. The RDS battery pilot cell voltage is ≥ 6.0 volts.
- (d) The overall battery voltage is ≥ 125 volts for the station battery and the RDS batteries.
- (e) Test-start the diesel generator and run for warm-up period.
- (f) Verify that the diesel generator battery electrolyte level is above plates and that the overall battery voltage is ≥ 24 volts.
- G. Add Section 11.4.5.3.4 as follows:
4. Quarterly - Verify the following:
- (a) That the specific gravity of the diesel generator battery is appropriate for continued service;

- (b) That the diesel generator battery and battery rack show no visual indication of physical damage or abnormal deterioration; and
- (c) That the diesel generator battery terminal connections are clean, tight, free of corrosion and coated with anticorrosion material.

H. Revise Section 11.4.5.3.5 to read:

- 5. Sixty months - At least once per 60 months during shut-down, verify that the RDS batteries and the station battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. This performance discharge test shall be performed subsequent to the satisfactory completion of the required battery service test of Part 11.4.5.3.A.1.(h).

I. Add Sections 11.3.5.3.A.8 and 9 as follows:

- 8. During the reactor power operation, the 138 kV line may be out of service for repair for periods up to three (3) days.
- 9. If Specification A.8 is not met, a normal orderly shutdown shall be initiated within one (1) hour and the reactor shall be shut down as described in Section 1.2.5(a) within twelve (12) hours and shut down as described in Section 1.2.5(a) and (b) within the following 24 hours.

J. Add the following sentence after the first paragraph in the Bases: The operability of the diesel battery and charger is verified by the weekly starting test of the diesel and by the weekly verification of the electrolyte level and overall battery voltage.

K. Revise Section 4.7.11.1.2.C.1 to read:

- 1. The batteries and battery racks show no visual indication of physical damage or abnormal deterioration, and

2.3 TECHNICAL EVALUATION

This technical review was performed based on the criteria set forth in IEEE Std-308-1974, IEEE Std-450-1975, and pertinent NRC Standard Technical Specifications. As far as changes A, B, C, D, E, F [(a) through (d)], and H are concerned, the licensee states [Ref. 2] that they are primarily editorial in nature. They were provided to improve clarity and to

correct what is claimed to be a minor error: each RDS battery cell is a 6-volt unit consisting of three sections per cell, thus minimum cell voltage for each RDS battery should be 6 V versus the presently specified 2 V.

IEEE Std-308-1974 requires a visual inspection of both batteries and the battery charger. These visual inspections are not mentioned explicitly in the proposed Technical Specifications, revision F, section 11.4.5.3.A.3.

Proposed change G, which adds section 11.4.5.3.4 to the Technical Specifications, does not conform to IEEE Std-308-1974; however, it does meet the intent of the NRC Standard Technical Specifications.

Changes F[(f)], G and J are provided to meet the intent of the staff's December 7, 1977 letter [Ref. 1]. They were developed based upon existing Technical Specifications requirements and supplemented by standards derived from the diesel fire pump battery surveillance. Other conditions considered include the fact that the diesel generator battery is only required during the starting of the diesel generator and that the diesel generator is started weekly. Thus, the operability of the battery is checked at least weekly through both diesel operation and battery electrolyte level and voltage checks. Further, the proposed quarterly checks provide an adequate level of assurance that no long-term degradation problems are developing and, as previously indicated, they are consistent with standards developed by the staff for the diesel fire pump batteries. There are no proposed changes to the "Limiting Conditions for Operation" for the diesel generator battery or charger since it is concluded that Section 11.3.5.3.A.2 is applicable for these components.

Change I is provided to clarify the operability status of the 138-kV power supply. Presently, the Big Rock Point Plant Technical Specifications do not specifically allow continued plant operation with the 138-kV line de-energized by virtue of stating that the line shall "normally be available." However, no required action is clearly identified, and there is no specified time frame in which to perform the action. In order

to rectify this situation, Change I is proposed. This change would allow continued reactor power operation for up to three days with the 138-kV line inoperable; after which, a plant shutdown would be required. This is consistent with the existing LCOs for the 46-kV power supply and the diesel generator, and is deemed appropriate since the level of backup electrical protection will not be reduced over that occurring with a loss of the 46-kV power supply or diesel generator, because the incoming 138-kV and 46-kV lines are independent and both can provide power to the same safety systems.

Change K is submitted to delete inspection of the diesel generator battery plates. This requirement is impossible to meet since the battery case is opaque (made of hard rubber) and, therefore, not conducive to plate inspections.

3. CONCLUSIONS

The changes in the Technical Specifications proposed by Consumers Power Company for the Big Rock Point plant satisfy the requirements set forth in the NRC Standard Technical Specifications, as mentioned previously. However, there are some discrepancies between some of the surveillance functions and the surveillance intervals and those given in IEEE Std-308-1974. Since the intervals and surveillance functions given in the IEEE standard are illustrative, it is concluded that the proposed Technical Specifications changes do conform to the intent of the NRC staff for emergency power sources for the Big Rock Point nuclear power plant. As such, we recommend that the NRC find the proposed changes to the Technical Specifications acceptable.

REFERENCES

1. NRC (D. K. Davis) letter to Consumers Power Company (D. A. Bixel) dated December 7, 1977.
2. Consumers Power Company (D. A. Bixel) letter to NRC (D. L. Ziemann) dated May 11, 1978.
3. IEEE Std-308-1974, "Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations."
4. IEEE Std-450-1975, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."
5. Big Rock Point FSAR.

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